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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/566,657

03/03/2006

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EXAMINER

WIESE, NOAH S

ART UNIT

PAPER NUMBER

1793

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DELIVERY MODE

03/05/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,657	Applicant(s) BOWE ET AL.	
	Examiner NOAH S. WIESE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/01/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

1. The claims 1-12 are pending and presented for the examination.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/GB04/03280.

Information Disclosure Statement (IDS)

3. The information disclosure statement (IDS) was submitted on 02/01/2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

Claim Objections

4. Claim 2 is objected to because of the following informalities: The claim limitation is to the percentage of solid material in the droplets, but it is not stated whether the percentage is by weight, volume, or mole. This renders the claim unclear. For purposes of examination on merits, the percentage has been treated as a weight percent. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112).

Regarding **claim 1**, Dupin teaches a method of coating an alumina-based slurry onto a metallic substrate for use as a catalyst. The coating slurry comprises water, and alumina binder, and a mixture of dispersible particulate alumina and undispersed particulate alumina filler. The alumina filler has an average particle size of 1-15 μm (see claim 1). The amount of dispersible alumina is between 10 and 40% of the particulate alumina (see claim 2). Dupin teaches that alumina binders whose viscosity can be varied by adjusting pH are known in the art, and that such a binder should be used for the alumina coating slurry (see column 3, lines 4-5 and 10-15). Therefore, it would be

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obvious to one of ordinary skill in the art that Dupin teaches adjusting the pH of the slurry so that it is of high viscosity.

Claim 1 differs from Dupin because Dupin does not teach that the substrate is coated by spraying the slurry onto the substrate with the substrate being heated to at temperature of 500°C to 750°C. However, the method of preparing a catalyst by spraying an oxide slurry onto a heated substrate was known in the art at the time the invention was filed. Muramatsu teaches a method of preparing a photocatalyst by spraying a colloidal metallic oxide solution onto the support while the support is heated to a temperature of between 200°C and 800°C, and in particular, 500°C (see Abstract, paragraph 0064, paragraph 0072, and paragraph 0087. *Per MPEP 2144.05, in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists*). One of ordinary skill in the art would have been motivated to use the spraying technique taught by Muramatsu to apply the slurry taught by Dupin because Muramatsu teaches that spraying onto a heated substrate improves the adhesion of the coating slurry (see paragraph 0013). This is clearly an advantageous improvement for coated catalyst supports. One would have expected reasonable success in this modification because both Dupin and Muramatsu teach methods of coating substrates with oxides for use as catalyst supports, so no detrimental results would be expected from the modification. Therefore, claim 1 is obvious and not patentably distinct over the prior art of record.

Regarding **claim 2**, Dupin teaches in example 1 a slurry containing 450 grams alumina and 1000 mL (grams) of water. The alumina is dispersed to the extent of 25%.

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This means that 75% of the alumina is undispersed (solid), so the solid content of the slurry and therefore the droplets when the method of Muramatsu is used would be 33.8 wt%. This is greater than 15% solid material.

Regarding **claim 3**, Dupin teaches that it was known in the art to use aluminum-bearing steel as a catalytic substrate to be coated with an oxide layer (see column 1, lines 32-39). Dupin further teaches in the examples that steels are used as the supports to be coated (see examples 2 and 4), but does not teach whether or not the steels contain aluminum. However, these teachings of Dupin would clearly convey to one of ordinary skill in the art that the slurry taught by Dupin could be used to coat aluminum-bearing ferritic steels.

Regarding **claim 4**, Dupin teaches that lanthanum nitrate is added to the alumina slurry as a stabilizer (see example 3). This would cause the ceramic layer to also contain this stabilizer.

Regarding **claim 5**, Dupin teaches that the oxide-coated substrate is subsequently calcined (see column 6, lines 46-50).

Regarding **claim 6**, Muramatsu teaches that multiple layers of oxides can be applied to the support, and that the multiple layers can comprise different oxides (see paragraph 0037). This would necessitate spraying slurries with different compositions.

Regarding **claim 7**, Dupin teaches that multiple oxide coatings can be applied to the substrate, but does not teach that the porosity increases towards the exposed surface (see column 6, lines 58-60). Muramatsu teaches that the coating method can include the steps of applying multiple coatings to the support wherein the first coating

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would have a higher density than the second coating so that the porosity would be higher at the surface of the coated substrate (see Abstract and claim 8). When combining the teachings of Dupin and Muramatsu, one of ordinary skill in the art would have been motivated to also include this coating method teaching of Muramatsu for use with the slurry of Dupin because Muramatsu teaches that multiple coatings with higher surface porosity leads to good catalytic results. Therefore, claim 7 is obvious and not patently distinct over the prior art of record.

Regarding **claim 8**, Dupin teaches that the substrate of the patent is useful for preparing catalysts. This suggests that catalyst material is incorporated into the porous ceramic layer. Additionally, Muramatsu teaches impregnating the metallic oxide layer formed on the catalyst support with a metallic compound (see claim 9). This metallic compound would form a metallic oxide catalytic material when calcined (see paragraph 0076), and therefore the impregnated support would become a catalyst. The teachings of Dupin and/or Muramatsu teach the incorporation of a catalytically active metal into a ceramic layer formed on a substrate. Therefore, the additional limitations of claim 8 are taught, and the claim is not patentably distinct.

Regarding **claim 11**, Dupin in view of Muramatsu teach a catalyst made by incorporating a catalyst material into a support made by an equivalent method of instant claim 1.

Regarding **claim 12**, Muramatsu teaches that titanium tetrachloride is incorporated into the ceramic layer (see paragraph 0076). Contacting the ceramic layer with a salt of a catalytic metal such as titanium tetrachloride would cause a catalytic

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metal to be incorporated. Baking of the ceramic incorporated with the salt solution transforms the titanium tetrachloride into titanium oxide (see paragraph 0076). This baking step would cause drying and calcining of the ceramic layer. Although Muramatsu does not teach repeating the incorporation and baking steps, these steps would be known and obvious to one desiring to increase the metallic oxide load in the ceramic layer. Therefore, claim 12 is not patentably distinct over the prior art of record.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112) and Johnson et al (US 6369000).

Regarding **claim 9**, Muramatsu teaches that titanium tetrachloride is incorporated into the ceramic layer (see paragraph 0076). Contacting the ceramic layer with a salt of a catalytic metal such as titanium tetrachloride would cause a catalytic metal to be incorporated. Claim 9 differs from Muramatsu because Muramatsu does not teach the solvent in which the metal salt is dissolved. However, the use of solvents for catalytic metal salts that meet the limitations of claim 9 are known in the art. The use of an alcohol solvent for the dissolved metal salt would mean using a solvent having a lower surface tension and viscosity than water, and the use of an alcohol solvent for this purpose was well known in the art at the time the invention was filed.

Johnson et al teaches a method of producing a catalyst wherein a solution containing the salt of a catalytic metal is incorporated into an alumina catalytic support (see Abstract). Johnson teaches that the solvent used to hold the catalytic metal salt can be alcohol. As discussed above, alcohol solvents have lower surface tensions and

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viscosities than water. Therefore, Johnson et al shows that the use of solvents with lower surface tensions and viscosities than water for the incorporation of metal salts into porous ceramic catalytic supports was known in the art at the time the invention was filed. Muramatsu et al does not teach the time of solvent to use for the incorporation, so one would be motivated to consult similar prior art such as Johnson et al to find teachings on possible solvents. Because Johnson et al teaches that alcohol is a possible solvent, one of ordinary skill in the art would have been motivated to use a solvent that meets the limitations of claim 9. One would have expected reasonable success because both documents teach the incorporation of metal salts into ceramic supports, and thus the documents are analogous art. Therefore, claim 9 is not patentably distinct over the prior art of record.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dupin (US 4529718) in view of Muramatsu (US 2002/0002112) and Gouzard et al (US 4956322).

Regarding **claim 10**, the claim differs from Dupin in view of Muramatsu because neither document teaches that the catalyst support incorporated with catalytic metal is coated with wax for protection. However, this protective coating step was known in the art to be beneficial at the time the invention was filed.

Gouzard et al teaches a catalytic metal-containing catalyst that is coated with wax in order to protect it from humidity in the air (see Abstract, example, and claim 1). Gouzard et al teaches that because many catalysts are susceptible to alteration upon exposure to air, treatments such as those taught in the patent are useful for protecting

said catalysts. This shows that coating a catalyst with wax to protect it from the atmosphere was known in the art at the time the invention was filed, and that one would have been motivated to perform such a coating because of the beneficial effects of the protection. Therefore, the additional limitation of claim 10 is obvious, and the claim is patentably indistinct over the prior art of record.

Conclusion

10. No claim is allowed.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Noah Wiese
February 20th, 2008
AU 1793

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793